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SIDE LIFT RUBBISH BIN LIFTER

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(56) Prior Art Documents

AU 610532 81428/87 B65F 3/04

AU 521074 35636/78 B65F 3/04

AU 30462/67 B65F 3/04

(57) Claim

1. An automatic bin lifter for lifting a bin from a rest position to an elevated tilted position to empty the bin contents into a container on a motor vehicle including a power driven linkage mounted on the vehicle adjacent to the driver's cabin, wherein the linkage includes bin engaging means for movement towards a bin on the ground to engage and lift the bin from the ground, wherein the linkages are arranged to move laterally outwardly of the vehicle to engage the bin on a line near the driving position in the driver's cabin.

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Form 1.

COMMONWEALTH OF AUSTRALIA

Patients Act 1952-1969

APPLICATION FOR A PATENT

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MACDONALD JOHNSTON ENGINEERING COMPANY PTY LTD
15 PARAN PLACE
GLEN IRIS VIC 3146

(2) More
about Title
of Invention.

hereby apply for the grant of a Patent for an invention entitled: ⁽²⁾

"SIDE LIFT RUBBISH BIN LIFTER"

which is described in the accompanying **PROVISIONAL** specification.

C/- WATERMARK PATENT & TRADEMARK
Our address for service is Messrs Edwards & Son, Attorneys,
50 Queen Street, Melbourne, Victoria, Australia.

M 011330 0300 03

DATED this 8th day of AUGUST 1989

MACDONALD JOHNSTON ENGINEERING COMPANY
PTY LTD

(3) Signatures of
Applicant (s)
or
Best of
Company and
Signatures of
its Officers as
prescribed by
its Articles of
Association

By,

L. J. MYSON

REGISTERED PATENT ATTORNEY

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

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In support of the Application made by⁽¹⁾.

MACDONALD JOHNSTON ENGINEERING CO. PTY LTD

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for a Patent for an invention entitled:⁽²⁾

"SIDE LIFT RUBBISH BIN LIFTER".

(3) Here
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authorised
to make
declaration.

I,⁽³⁾ IAN JAMES MACDONALD
of "EUREKA" LOT 2 SEWELL DRIVE HARKAWAY
MELBOURNE DIRECTOR

do solemnly and sincerely declare as follows:

1. I am authorized by⁽¹⁾

MACDONALD JOHNSTON ENGINEERING CO. PTY LTD

the applicant for the patent to make this declaration on its behalf.

(4) Here
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full Name
and Address
of Actual
Inventor or
Inventors.

2. ⁽⁴⁾ DAVID BROWNING Engineer

C/- MACDONALD JOHNSTON ENGINEERING CO. PTY LTD
15 PARAN PLACE, GLEN IRIS, VICTORIA 3146

the actual inventor of the invention and the facts upon which⁽¹⁾

MACDONALD JOHNSTON ENGINEERING CO. PTY LTD

is entitled to make the application, are as follow:

The said⁽¹⁾ MACDONALD JOHNSTON ENGINEERING CO. PTY LTD

(5) Full Name
of Actual
Inventor or
Inventors

is the assignee of the said⁽⁵⁾ DAVID BROWNING

Paragraph 2
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completed by
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(The said
(Name of

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COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

COMPLETE SPECIFICATION
(Original)

Class Int. Class

Application Number: PJ 5652

Lodged: 8th August 1989

Complete Specification Lodged:

Accepted:

Published:

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Related Art:

Name of Applicant: MACDONALD JOHNSTON ENGINEERING COMPANY PTY
LIMITED

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3122, AUSTRALIA

Complete Specification for the invention entitled:
Side lift rubbish bin lifter.

The following statement is a full description of this invention,
including the best method of performing it known to us.

SIDE LIFT RUBBISH BIN LIFTER

This invention relates to an automatic side bin lifter system.

Automatic side bin lifter systems are known to Applicant in which large rubbish bins can be lifted from a position at the side of the road and tilted to tip 5 the contents into a receiving compartment on a motor vehicle. The major advantage of such systems is that the vehicle driver does not normally need to leave his driver's seat to actuate the system.

Problems have been noted with the known system. Included amongst these is the difficulty in aligning the lifter mechanism with the bin by the operator.

10 The present invention has as its objective to provide an improved automatic rubbish bin lifting system wherein spillage is avoided or at least minimized, and operator functions and comfort are improved.

An automatic bin lifter for lifting a bin from a rest position to an elevated tilted position to empty the bin contents into a container on a motor vehicle said 15 container having at least a front and a side, said lifter including a power driven linkage mounted on the vehicle adjacent to the driver's cabin, the linkage including bin engaging means for movement towards a bin on the ground to engage and lift the bin from the ground, the linkage being arranged to move laterally outwardly of the vehicle to engage the bin on a line near the driving 20 position in the driver's cabin, wherein the power driven linkage is slidably supported on a frame, the frame being supported on a track for axial lateral movement to the side of the container on the vehicle to allow extension of the bin engaging means to a position distant from the vehicle; said frame and track being forwardly adjustable about a vertical axis to extend between a range of 25 angles of up to 45° to a line transverse of the motor vehicle, said track being located forwardly of the front of said container relative to the normal direction of travel of the vehicle.

The invention will be described in greater detail having reference to the accompanying drawings in which:



Figures 1 to 4 are schematic end elevations of a mobile rubbish collection vehicle with side lifter linkage and a bin engaging device at various points of travel.

Figure 5 is a schematic view showing the bin tipping movement.

Figure 6 is a plan view of a modified bin engaging linkage.

Figure 7 is an elevational view of the bin engaging linkage of Figure 6.

10 Figure 8 is a schematic plan view of an angulated extension device.

Figure 9 is a schematic plan view of a swivel support for the lift linkage which may be in combination with a swivel support for a side extension device.

15 Referring to Figures 1 to 5, a rubbish container 2 is mounted on a mobile chassis 3, 4. A pantograph type linkage assembly is supported on a base member 29 supported on the chassis member 4. The linkage assembly includes a power cylinder 10 pivotally supported between pivot points 12, 12a.

20 The links 16 and 18 are pivotally connected at point 19 and are controlled in their movement by power cylinder 10 and control link 17, so that the path of movement of the bin engaging device 25 follows a pre-determined path as will be apparent with reference to Figures 1 to 5.

25 Figures 1 to 5 show the various positions of the bin engaging device 25 along a line of movement from a retracted position shown in Figure 1 to a bin engaging position shown in Figure 4.

The bin engaging device 25 includes pick up teeth 26b 30 and an abutment for engaging the side of a bin. The device 25 is pivotally mounted on shaft 27 for controlled movement to engage the pick up teeth 26b with the bin lip edge 28. The movement of the bin engaging device 25 is controlled by a small hydraulic power cylinder 11 for oscillating the pick up 35 teeth 26b to facilitate engagement with the bin lip edge 28.



Referring to Figure 5 the bin is tilted by power cylinder 11 through a large angle to tip the bin contents into the container 2 at the top of its travel.

Reference to Figures 1 to 5 illustrate a feature of 5 the present invention namely the substantially constant vertical alignment of the bin axis in its vertical orientation during its path of travel from the rest position on the ground to the tipping position shown in Figure 5 from where it can be tilted to tip the bin contents into the rubbish container 2.

10 Referring to Figures 8 and 9 the base member frame 29 may be mounted on a pivotal head 29a, pivotal about a vertical axis shown such that the linkage frame moves along a line forwardly of the container to be located on a line to the side of the driving cabin 5 of the vehicle 4. Thus, the bin 15 engaging operation can take place directly to the side in the line of sight of the driver whilst he is seated in the cabin.

Figure 8 shows a track member 26a slidably mounted on base member 29 for lateral extension to the side of the vehicle by up to 3 metres for engaging bins in and out of the 20 way position from the container.

Alternatively, the base member 29 may undergo pivotal movement about pivotal head 29a to be angled forward so that upon extension of the base member 29 the bin

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engaging device will move forwardly into line with the driver's cabin. In a further alternative, the base member 29 may be simply fixedly mounted at an angle to allow traverse of the linkage assembly towards a position aligned with the 5 driver's cabin.

The general operation of the linkage and power cylinders is preferably controlled by onboard electronics and electrical hardware including a computer and potentiometers at the pivot points of the linkage and preferably a manual 10 control lever.

The system is particularly adapted to standard tipping bins of 240 litre design. The electronic control equipment allows the driver to actuate the system from the driver's seat (in right or left hand drive mode) and be able 15 to utilize his direct visual sight to operate the bin engaging and disengaging steps.

The various mounting alternatives for the support linkage enables the operator to selectively move the linkage assembly in and out to engage a bin in an out of the way 20 position and at the same time vary the angle of rotation of the discharge support and thereby position the bin engaging means at any desired location.

The angular movement of the linkage support may be variable between a range of angles of up to 45° and preferably 25 at least 30°.

The invention also may provide a modified bin engaging device utilizing clamping arms 41 actuated by hydraulic power cylinders 45 and 46 as shown in Figures 6 and 7.

30 The clamp arms 41 form an arcuate shape and include a flexible high friction belt 42 spring loaded or tensioned to allow formation around a bin 40 to hold round or square bins in a lift mode by applying friction to the bin walls by application of force by the friction belt 42. Thus, high 35 point pressure is reduced on the bin walls to minimise possibility of bin crushing.

5a

The clamp arms are fitted to the bin lifting device previously described and a rotating frame enables the bin to be lifted as shown with reference to Figures 1 to 5 in a

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vertical position until the tip point is reached whereupon the bin is rotated to a tipping position. A cushioning system may be provided to prevent the bin being damaged by any forward inertia during the tipping operation.

5 The provision of the clamp arms 41 and tensioned belt 42 to engage round or square bins will reduce bin fatigue and crushing forces and will operate in wet or dry conditions.

10 Thus the present invention provides several features utilizing the pantograph linkage design for maximum reach of the bin lifter and this coupled with a rotating head or inclined slide track enables full utilization of the bin engagement device whilst the operator is seated in the driving seat.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An automatic bin lifter for lifting a bin from a rest position to an elevated tilted position to empty the bin contents into a container on a motor vehicle said container having at least a front and a side, said lifter including a power driven linkage mounted on the vehicle adjacent to the driver's cabin, the linkage including bin engaging means for movement towards a bin on the ground to engage and lift the bin from the ground, the bin engaging means being arranged to move laterally outwardly of the vehicle to engage the bin on a line near the driving position in the driver's cabin, wherein the power driven linkage is slidably supported on a frame, the frame being supported on a track for axial lateral movement to the side of the container on the vehicle to allow extension of the bin engaging means to a position distant from the vehicle, said frame and track being forwardly adjustable about a vertical axis to extend between a range of angles of up to 45° to a line transverse of the motor vehicle, said track being located forwardly of the front of said container relative to the normal direction of travel of the vehicle.
2. An automatic bin lifter as claimed in Claim 1 wherein said power driven linkage includes a pair of links pivotally attached to the vehicle chassis or container and a third link connected at or near one end to the remote ends of said first-mentioned links and at the other end to the bin engaging means wherein one of said first or second links is actuated by a power cylinder.
3. An automatic bin lifter as claimed in Claim 1 or Claim 2 wherein the bin engaging means includes pick up teeth engageable with a part of the bin to be lifted for securely fastening said bin during a engaging operation.
4. An automatic bin lifter as claimed in any preceding Claim wherein the bin engaging means is pivotally attached to the linkage and includes power cylinder means for tilting the bin to tip the contents into the rubbish container.



5. An automatic bin lifter as claimed in any preceding Claim wherein the said bin engaging means includes clamp arms of arcuate shape and include a flexible friction belt tensioned to allow formation around a bin and adapted to hold the bin a lift mode by applying friction to the bin walls said clamp arms being pivotal to an open and close position for fitting to the bin during an engaging step.
6. An automatic bin lifter substantially as hereinbefore described with reference to the accompanying drawings.

DATED this 19th day of August, 1994.

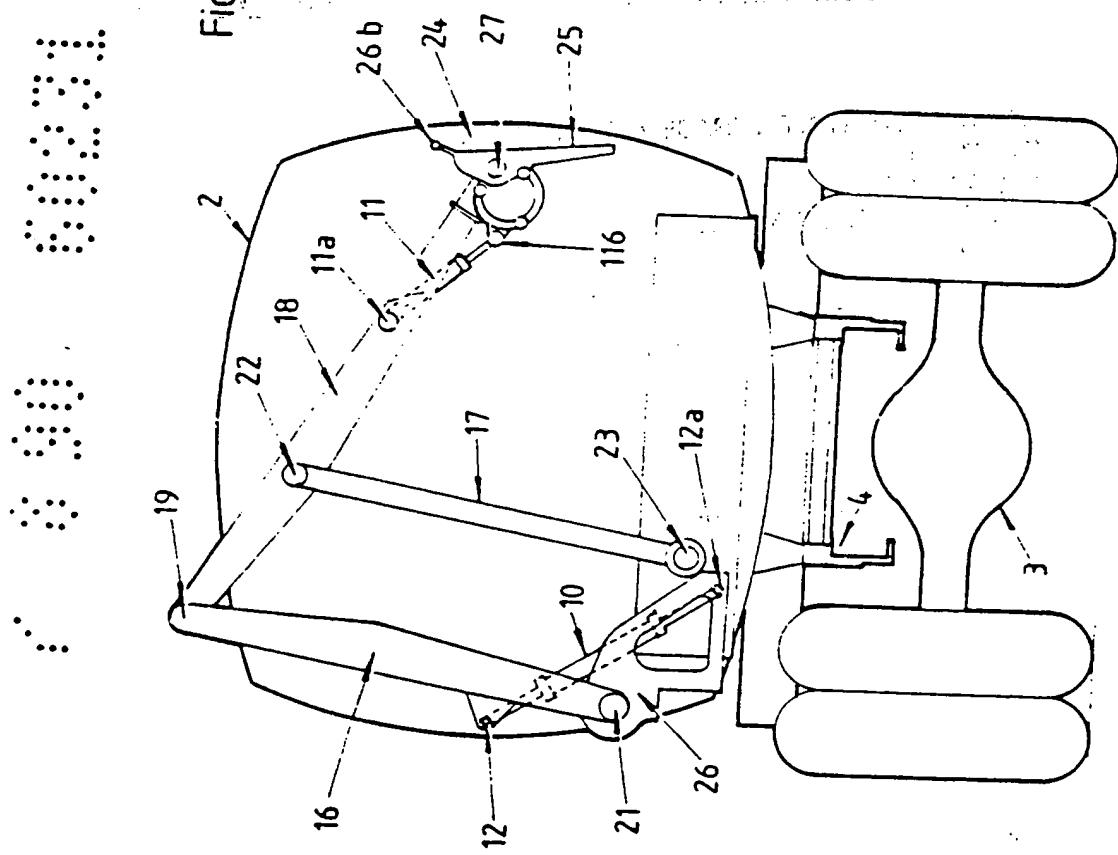
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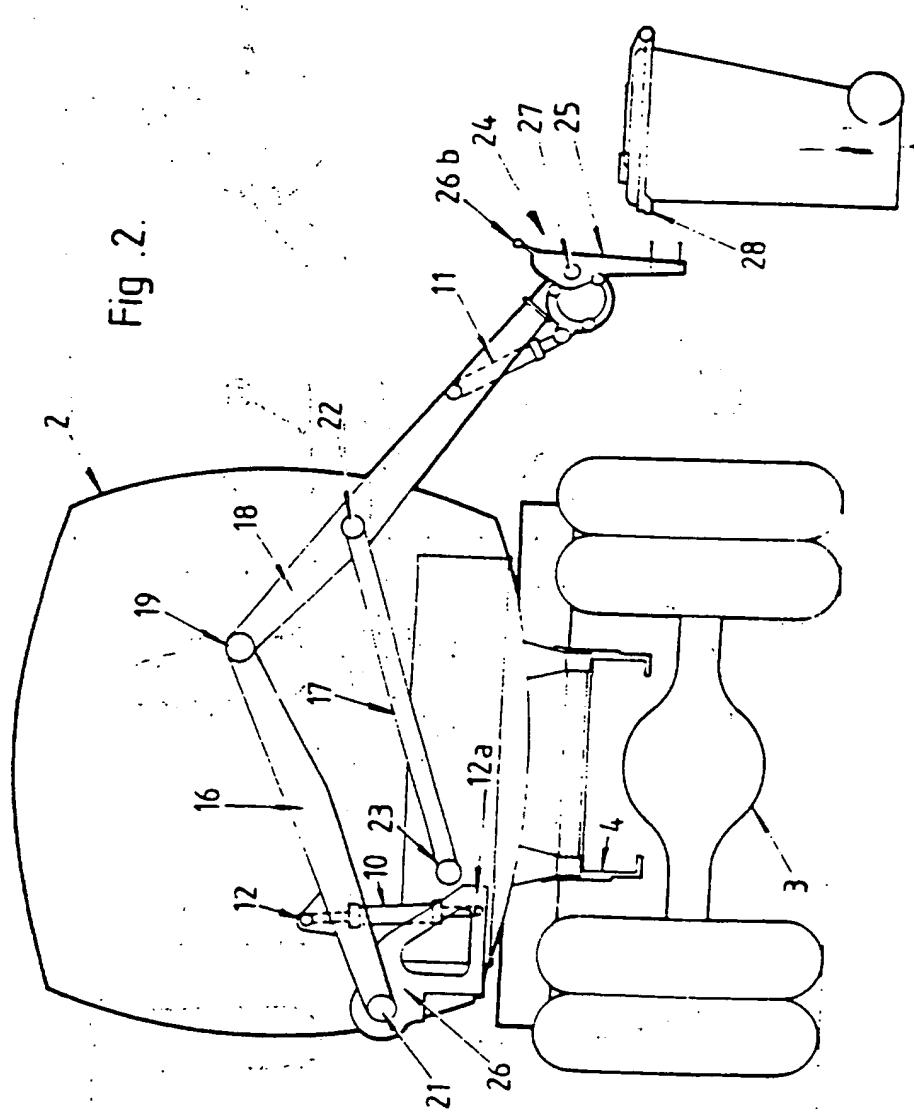
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Fig. 1.



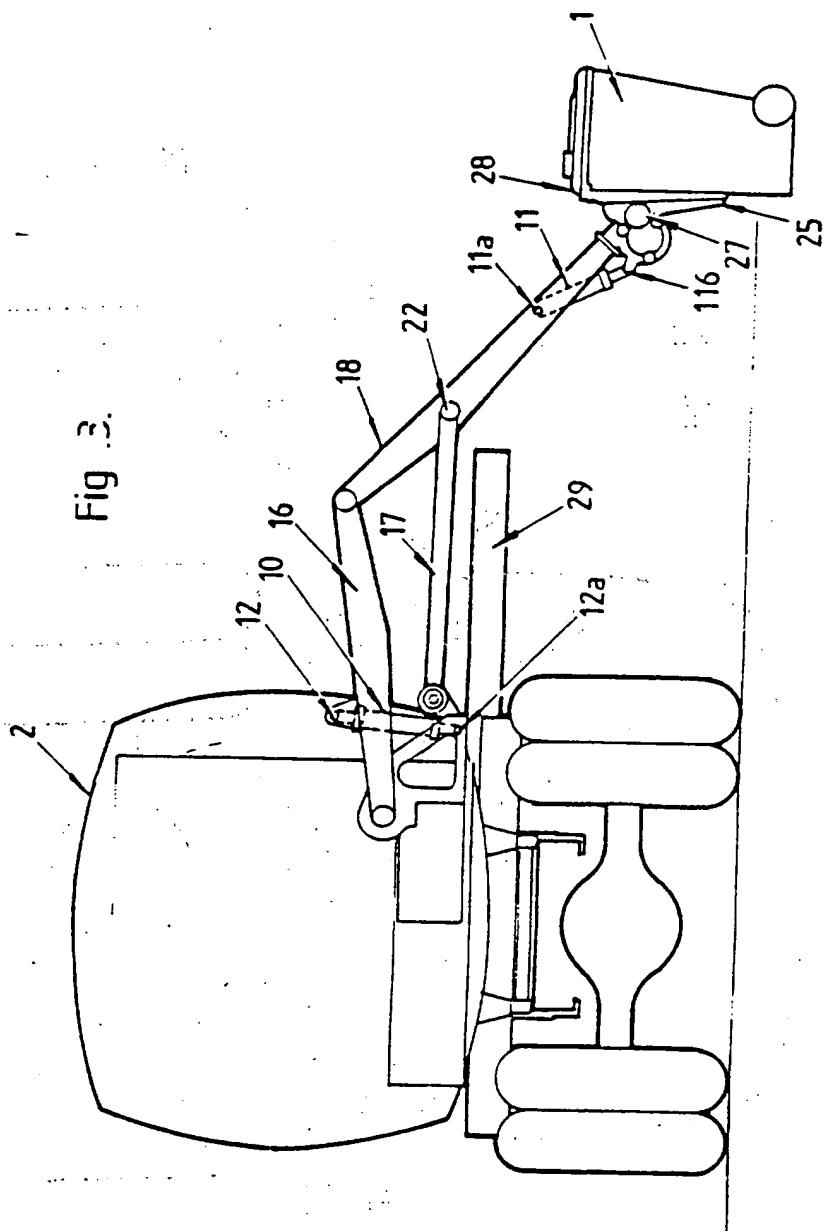
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Fig. 2.



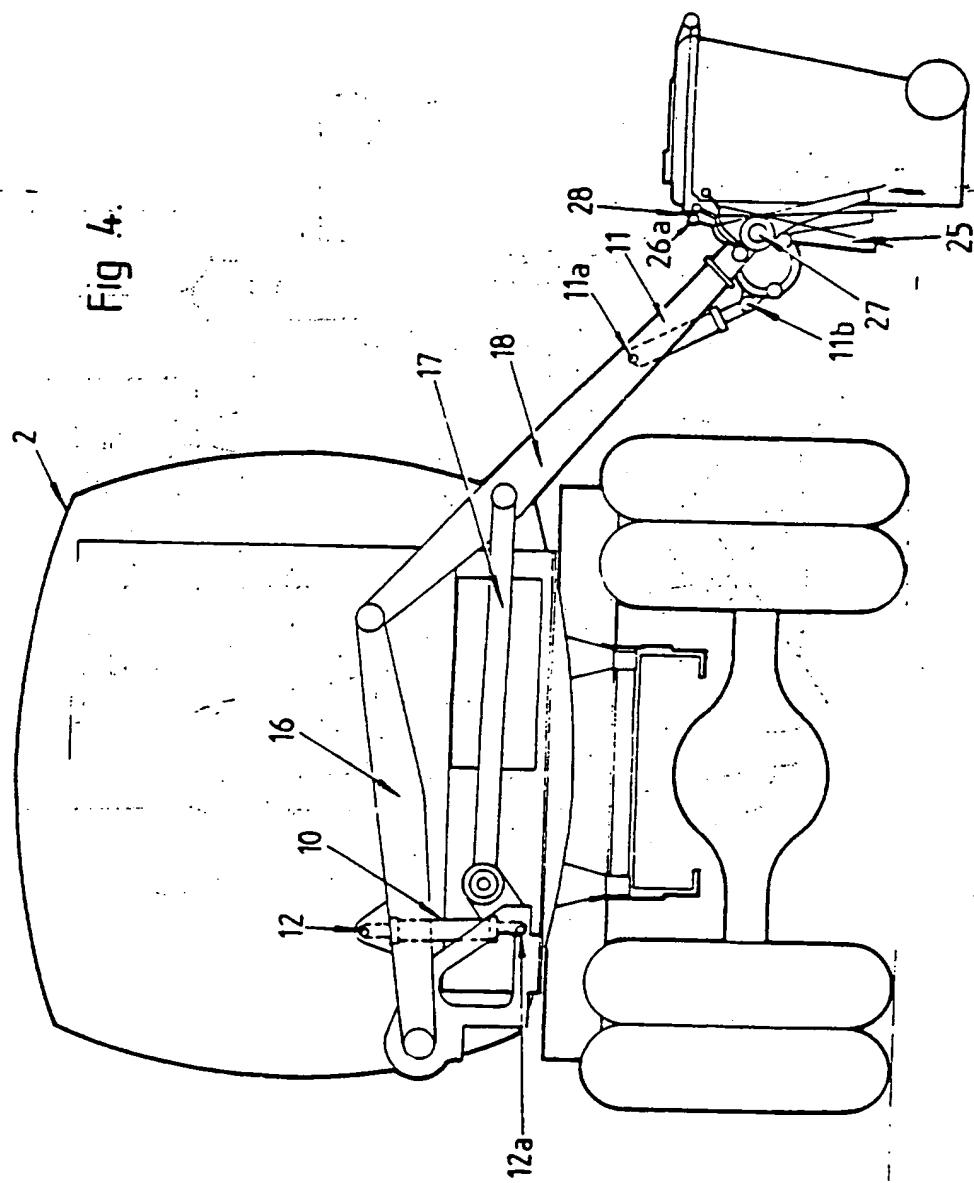
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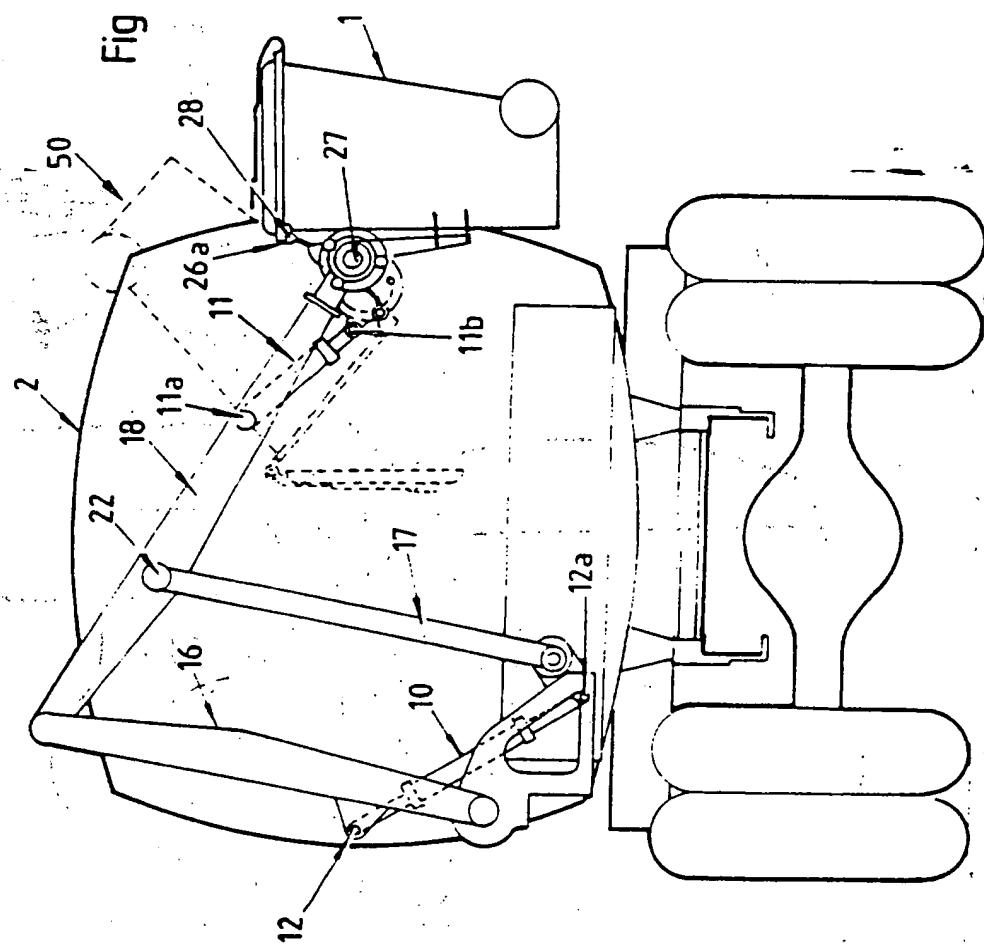
Fig. 4.



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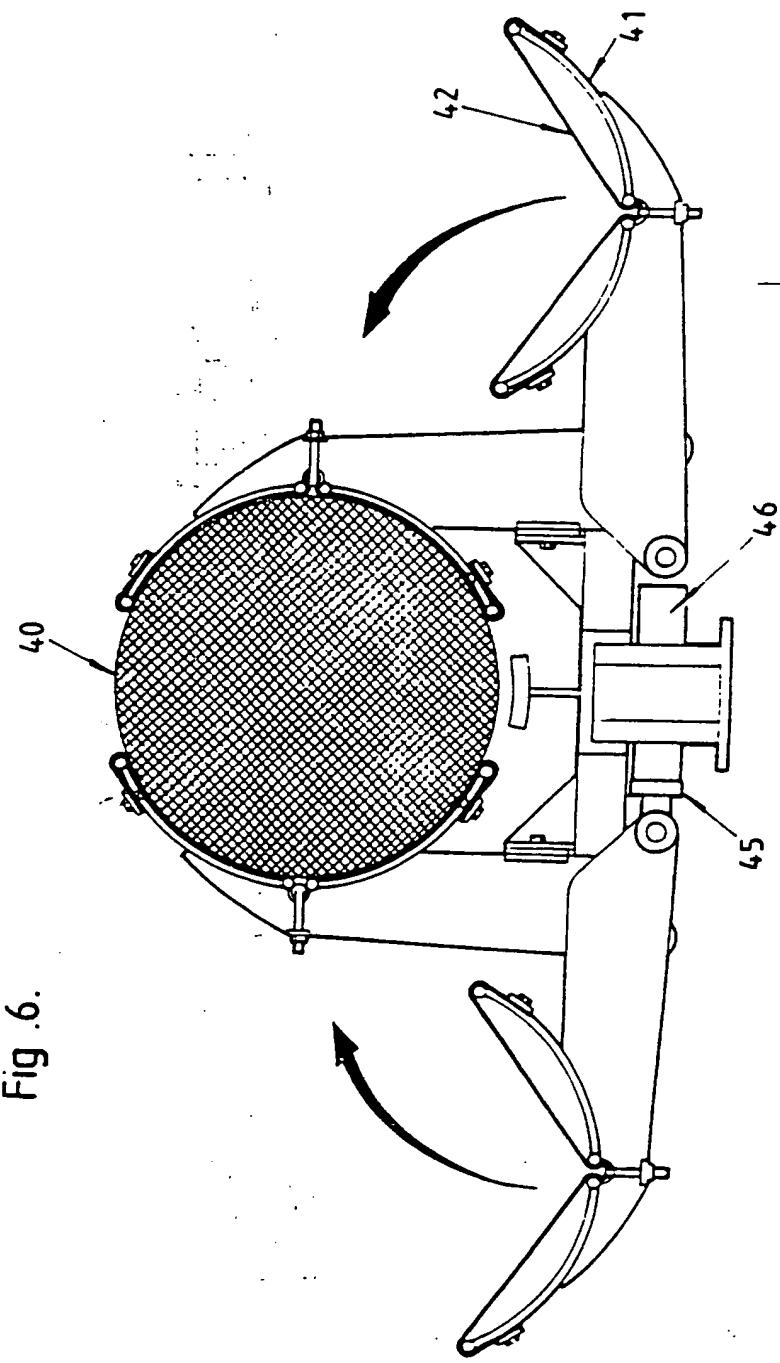
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Fig. 5.



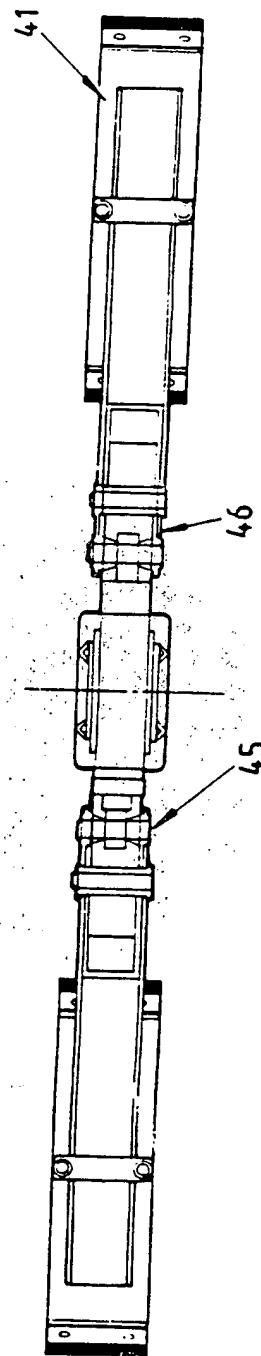
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Fig. 6.



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Fig. 7



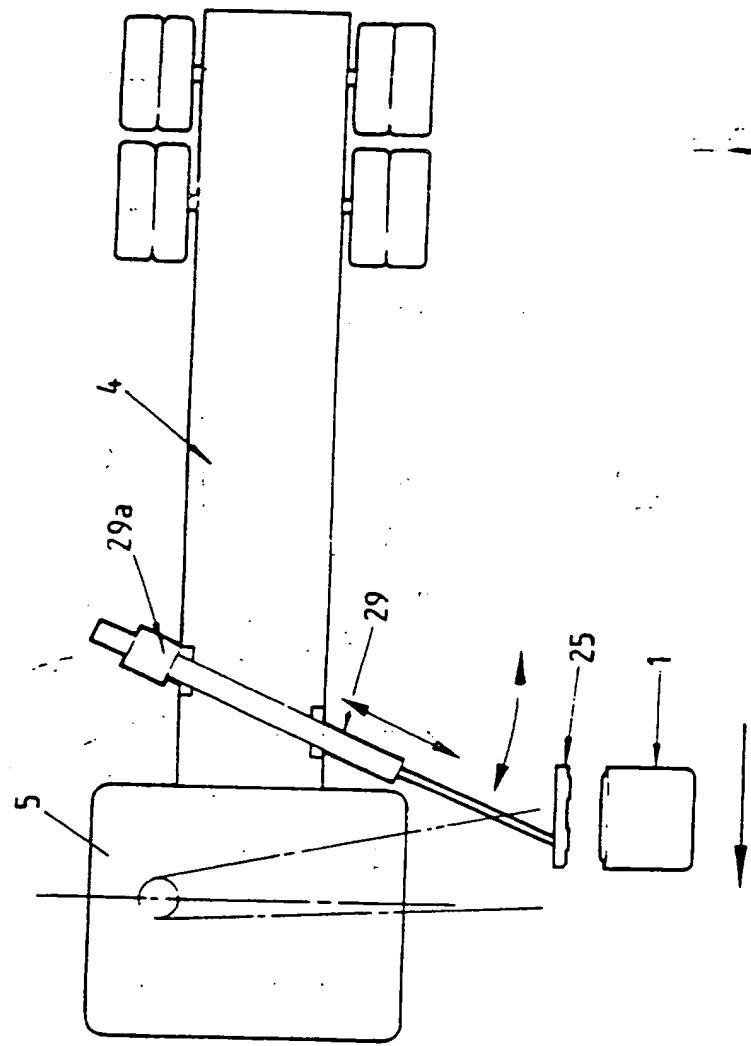
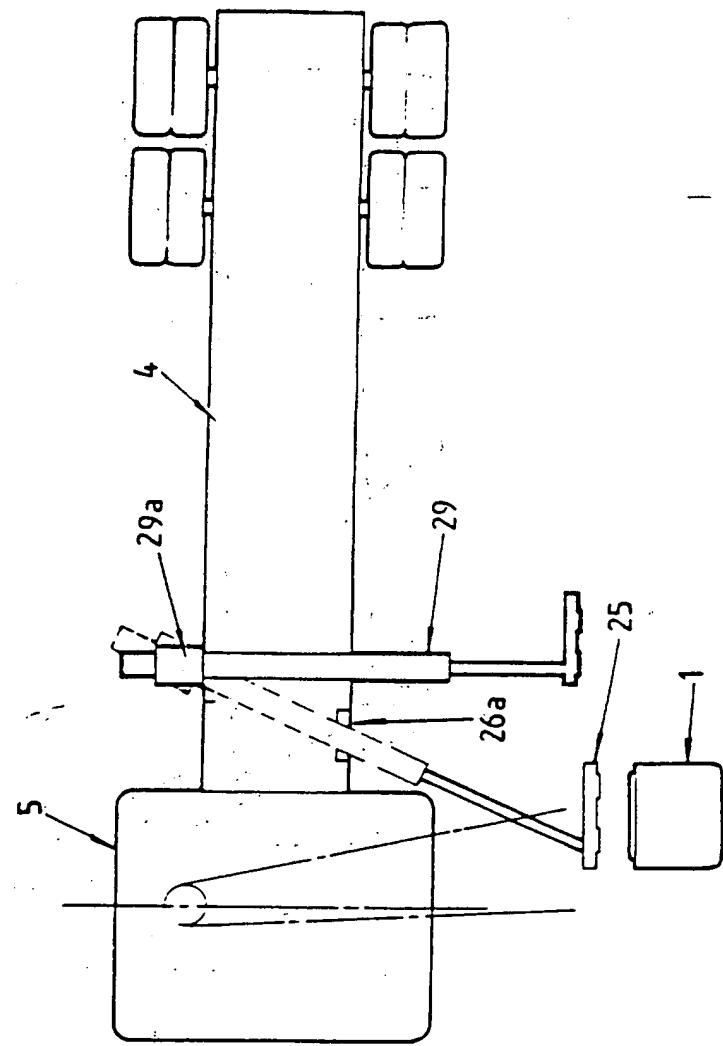


Fig. 8.

Fig. 9.



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